

Normal basal ganglia variation in the human brain: an MRI and VBM based morphological and morphometrical analysis

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In this report we highlighted basal ganglia morphology and volume differences in normal humans in comparison to gender and age sub-groups. We measured the volumes of the caudate nucleus, the putamen, and the globus pallidus on MR images of 52 healthy adults whose ages at baseline ranged between 20 and 84 years; we also made a comparison with lateral ventricles. The method applied is three-dimensional (3D) volume rendering starting from structural magnetic resonance imaging (MRI) studies of selected brain regions (basal ganglia e lateral ventricles). The analysis revealed a significant main effect of age, gender and craniometric index. Regarding gender subgroups the Mann–Whitney test showed significant differences between groups in the following parameters: Left putamen greater in males than in females, and Left pale nucleus greater in females than in males. Regarding age subgroups differences were found in subjects < 35 years old with statistical decrease of right caudate nucleus, meanwhile left caudate nucleus had no significant statistical differences. Regarding craniometric index subgroups significant differences between groups emerged only in both ventricular volumes. Our findings were consistent with literature and may shed light on some of the discrepancies in previous reports on basal ganglia volume shrinkage and ventricle volume enlargement.

Keywords: VBM, MRI, basal ganglia